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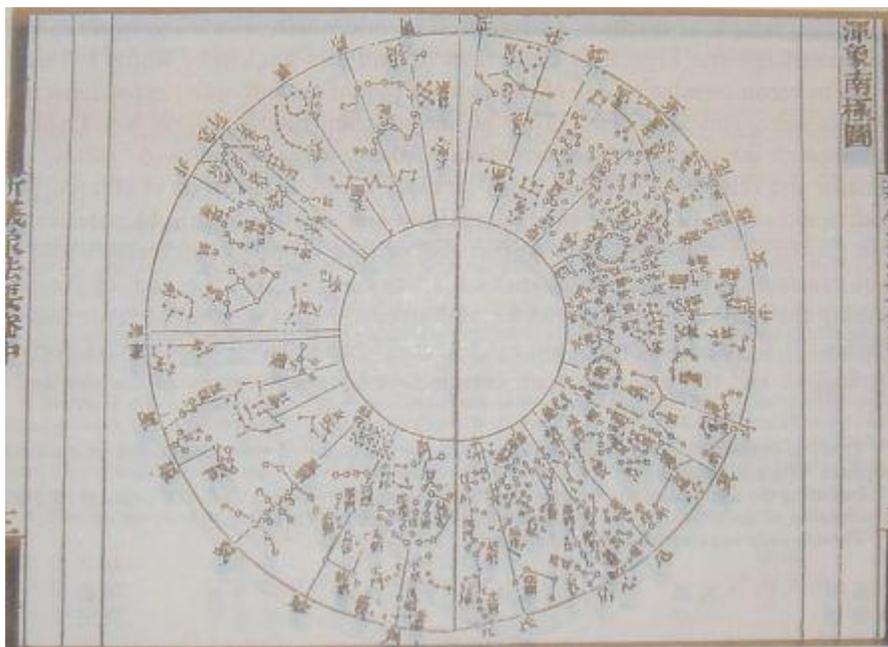
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Guest Blog

From STEM to STEAM: Science and Art Go Hand-in-Hand

By Steven Ross Pomeroy on August 22, 2012



In the wake of the recent recession, we have been consistently apprised of the pressing need to revitalize funding and education in STEM fields -- science, technology, engineering, and math. Doing this, we are told, will spur innovation and put our country back on

Su Song pic - Art meets science in this early star map drawn by Su Song.
(public domain)

the road to
prosperity.

Renewing our focus on STEM is an unobjectionably worthwhile endeavor. Science and technology are the primary drivers of our world economy, and the United States is in the lead.

But there is a growing group of advocates who believe that STEM is missing a key component – one that is equally deserved of renewed attention, enthusiasm and funding. That component is the Arts. If these advocates have their way, STEM would become STEAM.

Their proposition actually makes a lot of sense, and not just because the new acronym is easy on the ears. Though many see art and science as somewhat at odds, the fact is that they have long existed and developed collaboratively. This synergy was embodied in great thinkers like the legendary Leonardo Da Vinci and the renowned Chinese polymath Su Song. One of Carl Jung's mythological archetypes was the artist-scientist, which represents builders, inventors, and dreamers. Nobel laureates in the sciences are seventeen times likelier than the average scientist to be a painter, twelve times as likely to be a poet, and four times as likely to be a musician.

Camouflage for soldiers in the United States armed forces was invented by American painter Abbot Thayer. Earl Bakken based his pacemaker on a musical metronome. Japanese origami inspired medical stents and improvements to vehicle airbag technology. Steve Jobs described himself and his colleagues at Apple as artists.

At TED 2002, Mae Jemison, a doctor, dancer, and the first African American woman in space, said, "The difference between science and the arts is not that they are different sides of the same coin... or even different parts of the same continuum, but rather, they are manifestations of the same thing. The arts and sciences are avatars of human creativity."

Despite the profound connection between art and science, art programs across the nation are on the chopping block. In June, the U.S. House of Representatives proposed significant funding cuts to the National Endowment for the Arts. Schools nationwide are eschewing art programs to instead focus on teach-to-the-test courses catered to math and reading. The problem here is that a narrow focus on testing reinforces narrow-minded thinking. Young Americans are being educated out of creativity.

By teaching the arts, we can have our cake and eat it, too. In 2008, the DANA Arts and Cognition Consortium, a philanthropic organization that supports brain research, assembled scientists from seven different universities to study whether the arts affect other areas of learning. Several studies from the report correlated



Apple Store pic - Apple is a prime example of creativity and artistry spurring innovation. (Photo by Nk via Wikimedia Commons)

training in the arts to improvements in math and reading scores, while others showed that arts boost attention, cognition, working memory, and reading fluency.

Dr. Jerome Kagan, an Emeritus professor at Harvard University and listed in one review as the 22nd most eminent psychologist of the 20th century, says that the arts contribute amazingly well to learning because they regularly combine the three major tools that the mind uses to acquire, store, and communicate knowledge: motor skills, perceptual representation, and language.

“Art and music require the use of both schematic and procedural knowledge and, therefore, amplify a child’s understanding of self and the world,” Kagan said at the John Hopkins Learning, Arts, and the Brain Summit in 2009.

With this realization in mind, educators across the nation are experimenting with merging art and science lessons. At the Wolf Trap Institute in Virginia, "teaching artists" are combining physical dance with subjects like math and geometry. In Rhode Island, MIT researcher Jie Qui introduced students to paper-based electronics as part of her master's thesis exploring the use of technology in expressive art. Both programs excited students about science while concurrently fueling their imaginations. A potent blend of science and imagination sounds like the perfect concoction to get our country back on track.

"My kids didn't grow up in grade school saying, 'I want to be a technical sound engineer.' They grew up saying, 'I want to be a rock star,'" asserts Stephen Lane, CEO of medical device design company Ximedica and a huge proponent of STEAM.

Celebrated physicist Richard Feynman once said that scientific creativity is imagination in a straitjacket. Perhaps the arts can loosen that restraint, to the benefit of all.

The views expressed are those of the author(s) and are not necessarily those of Scientific American.

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